

STABLE POLYMER COMPOSITIONS AND METHODS OF MAKING SAME

I. Background of the Invention

- [1] This invention relates to stable polymer compositions. Polymer chemistry is an unpredictable field and often yields unstable compositions, which are difficult to use because the composition changes over time.
- [2] Polymer compositions are used in many fields for many uses including coatings.
- [3] In the coatings industry, most coatings comprise fluorocarbon and/or polyolefin polymers which are undesirable for many reasons such as environmental pollution concerns, difficulty in producing the coatings, high costs, and safety concerns in manufacturing. The present invention does not include fluorocarbon or polyolefin polymers and may be used as coatings which are stable, relatively inexpensive and easily formed without the environmental concerns associated with fluorocarbons. The present invention comprises aqueous non-fluorocarbon polymer emulsions, which may be used in coatings.

II. Summary of the Invention

- [4] According to the present invention, polymer compositions which are very stable may be formed and used as coatings for a variety of substrates, including but not limited to paper (including but not limited to food packaging), vinyl, plastics, other man-made substances, metal, and wood. Some of the coatings may be heat resistant, grease resistant and/or acceptable for food packaging.
- [5] Without being limited to this mechanism, it is believed that the following is the mechanism of action for the stable polymer compositions. Entropy is the disorder of a system, and in thermodynamics, entropy approaches zero for a system when the process is reversible (this is referred to as the Second Law of Thermodynamics). See Perry's Chemical Engineers' Handbook, Sixth Edition (1984) p. 4-53 (herein incorporated by reference). Conversely, systems which are very stable have high entropies. In the present invention, it is believed without limitation, that the polymer composition (or composition) may have subcompositions, which may be correlated to the phases as set forth in the examples below. It is believed without

limitation that the subcompositions have high entropy and when the subcompositions are placed in the composition, the composition has high entropy and therefore is very stable. The high entropy of the composition also means that the composition is more likely to be irreversible and increases the stability of the composition. This high entropy may also increase the overall glass transition temperature and thermal stability and decrease thermal decomposition of the composition.

- [6] Further, without limitation, it is believed that the existence of subcompositions within the composition reduces the amount of energy required to increase the entropy. Without being limited, it is believed that the stability of the composition results in an increased shelf life, and the high level of entropy decreases the amount of heat energy needed to change the state of the polymer composition.
- [7] The present invention comprises a composition which is made up of one or more subcompositions. The compositions may be emulsions, dispersions, suspensions, and solutions, preferably emulsions, until dried. The subcompositions are formed, are stable and do not react further even when present in the composition, which may include other subcompositions (which may or may not have the same components). Some embodiments of the subcompositions have been sufficiently stable to pass shear tests, which means that they have good shear strength.
- [8] The compositions may be dried according to drying methods known to one of ordinary skill in the art, preferably by exposure to air at about atmospheric pressure and about room temperature. It is believed, without limitation, that in some preferred embodiments, each subcomposition forms a separate layer after the polymer composition is applied as a coating and dries.

III. Detailed Description of the Invention

- [9] The compositions are made by forming separate subcompositions, preferably in sequence. In this specification, a "phase" forms a separate subcomposition. In certain embodiments, if the subcompositions are not formed in sequence, but rather all of the materials are combined at the same time, the composition may form a gel instead of an emulsion. The emulsion is preferred. Each composition preferably has a pH of between about 8 and about 9.5, and the viscosity of the composition is preferably about 300 cps to about 1500 cps measured on a Brookfield Viscometer LVF with spindle #12.

[10] When each subcomposition is formed, in preferred embodiments, some of the components of certain subcompositions may be added repeatedly, so that the total amount of a component needed in the subcomposition is divided and added at different times or added repeatedly alternating with some or all of the remaining components in that subcomposition.

[11] Specific, non-limiting examples of subcompositions that may (without limitation) be formed by repeated addition of the required components in portions (with the repeated portion amounts equaling the total amount of component in the subcomposition) to a given subcomposition are as follows:

Example A: a subcomposition including without limitation one or more ethylene-vinyl chloride emulsions and one or more acrylic emulsions;

Example B: a subcomposition including without limitation one or more acrylic resin, one or more acrylic emulsions and one or more ethylene-vinyl chloride emulsions;

Example C: a subcomposition including without limitation one or more ethylene-vinyl chloride emulsions;

Example D: a subcomposition including without limitation one or more acrylic emulsions and one or more vinyl acetate emulsions;

Example E: a subcomposition including without limitation one or more acrylic resins, one or more acrylic emulsions and one or more vinyl acetate emulsions;

Example F: a subcomposition including without limitation one or more acrylic resins and one or more acrylic emulsions;

Example G: a subcomposition including without limitation one or more acrylic resins, one or more acrylic emulsions and water;

Example H: a subcomposition including without limitation one or more acrylic emulsions

Example I: a subcomposition including without limitation one or more acrylic emulsions, and one or more waxes

Example J: a subcomposition including without limitation one or more acrylic emulsions, water, one or more acrylic colloid dispersions, and propylene glycol.

- [12] If a given component is added in portions to the subcomposition instead of the total amount at once, the number of repetitions a given component added in portions may be as low as two times and as high as desired for the particular coating and its use, preferably 2 to 9 times, more preferably 3 to 8.
- [13] Each subcomposition within the composition (also called the polymer composition) may comprise the identical components as other subcompositions or may comprise one or more different components from other subcompositions. Each subcomposition may exist more than once in a composition as a separate stable entity.
- [14] In preferred embodiments, each subcomposition is formed at about room temperature and about atmospheric pressure under constant mixing. Preferably, all of one subcomposition's components are added under constant mixing before any other subcomposition's components are added to the composition.
- [15] In a preferred embodiment, each composition comprises at least two different subcompositions.
- [16] In preferred embodiments, the subcompositions are formed in sequence with continuous mixing and at about room temperature and about atmospheric pressure. Room temperature in this specification is about 75°F. Each subcomposition may separately be formed and exist without the other subcompositions, as its own polymer composition.
- [17] In some preferred embodiments, pastes, such as without limitation, compositions including clays, starches, pastes, metal oxides and combinations thereof may be desirable to improve a polymer composition's coating characteristics. Preferably, these pastes may be added to a premix (or other subcomposition) preferably under constant mixing and about room temperature and about atmospheric pressure.
- [18] In a preferred embodiment, a paste comprises at least one metal oxide(e.g. without limitation Hydrogloss 90 from J.M. Huber), baking soda, starch (e.g. without limitation Catosize 270A from National Starch), water, and one or more acrylic resins (e.g. without limitation Joncryl® HPD 96). Another preferred embodiment of

a paste comprises at least one metal oxide (e.g. without limitation Hydrogloss 90 from J.M. Huber), baking soda, starch (e.g. without limitation Catosize 270A from National Starch), water, and one or more acrylic colloid (e.g. without limitation Vancryl® 450). Another preferred embodiment of a paste comprises at least one metal oxide (e.g. without limitation Hydrogloss 90 from J.M. Huber), baking soda, starch (e.g. without limitation Catosize 270A from National Starch), water, one or more acrylic resins (e.g. without limitation Joncryl® HPD 96) and one or more acrylic colloid (e.g. without limitation Vancryl® 450).

[19] In this specification, all components with the trademarks Joncryl or Jonwax are sold by Johnson Polymer, LLC. All components with the trademark Vancryl are sold by UCB Chemical Group.

[20] Acrylic Resins include, but are not limited to copolymers with other acrylic monomers, copolymers with other acrylic polymers, styrenated acrylic resins, styrenated acrylic resin solutions, Acrylic Emulsions made from Acrylic Resins and/or Acrylic Resin Solutions, Joncryl® HPD 96, Joncryl® 56, Joncryl® 57, Joncryl® 58, Joncryl® 59, Joncryl® 60, Joncryl® 61, Joncryl® 62, Joncryl® 63, Joncryl® 70, Joncryl® HPD 71, Joncryl® 73, Joncryl® ECO 75, Joncryl® ECO 84, Joncryl® DFC 3015, Joncryl® DFC 3025, Joncryl® 52, Joncryl® 50, Vancryl® 65, Vancryl® 68, Vancryl® 68S, Vancryl® 710, Joncryl® 67, Joncryl® 586, Joncryl® 611, Joncryl® HPD 671, Joncryl® ECO 675, Joncryl® 678, Joncryl® 680, Joncryl® 682, Joncryl® ECO 684, Joncryl® 690, Joncryl® 693, Joncryl® HPD 696 and combinations thereof.

[21] Acrylic Emulsions include, but are not limited to emulsions made from the following: copolymers with other acrylic monomers, copolymers with other acrylic polymers, acrylic binders, acrylic vinyl acetate co-polymers, acrylic vinyl ethylene co-polymers, acrylic vinyl ethylene chlorides co-polymer blends, acrylics co-polymer of any wax, acrylic paraffin wax copolymer, acrylic paraffin blends, acrylic polyethylene wax co-polymer blends, acrylic co-polymer blends with polypropylene waxes, acrylic co-polymers and co-polymer blends with glycols and polyhydric alcohols, acrylic copolymer and copolymer blends of polycarbonates, acrylic copolymers and co-polymers of polyurethanes, acrylic copolymers and copolymer blends of phthalates, styrenated acrylic emulsions, Joncryl® 74, Joncryl® 77, Joncryl® 585, Joncryl® 617, Joncryl® 624, Joncryl® 660, Joncryl® 1536, Joncryl® HRC 1645, Joncryl® HRC 1620, Joncryl® HRC 1661, Joncryl® HRC 1663,

Joncryn® 1695, Joncryn® ECO 2117, Joncryn® ECO 2124, Joncryn® ECO 2177, Joncryn® 2178, Joncryn® 2640, Joncryn® 2641, Joncryn® 2660, Joncryn® DFC 3030, Joncryn® DFC 3040, Joncryn® DFC 3060, Vancryn® 989, Vancryn® 937, Vancryn® 965, Vancryn® 960, Vancryn® 965, Vancryn® 960, Vancryn® 965 DEV, Vancryn® 990 EXP, Joncryn® 89, Joncryn® 537, Joncryn® 538, Joncryn® 631, Joncryn® 1680, Joncryn® 2153, Joncryn® 2161, Joncryn® ECO 2189, Joncryn® DFC 3050, and combinations thereof.

- [22] Waxes include, but are not limited to Jonwax® 4, Jonwax® 22, Jonwax® 26, Jonwax® 28, Jonwax® 39, Jonwax® 120, Vancryn® 35, and combinations thereof.
- [23] Ethylene-Vinyl Chloride Emulsions include, but are not limited to Vancryn® 600, Vancryn® 605, and Vancryn® 610, and combinations thereof.
- [24] Vinyl Acetate Emulsions include, but are not limited to Vancryn® 825 and Vancryn® 650, and combinations thereof.
- [25] Acrylic Colloid Dispersions include, but are not limited to Vancryn® 445, Vancryn® 450, Vancryn® 454, Joncryn® 91, Joncryn® 99, Joncryn® 100, Joncryn® 142, Joncryn® 637, Joncryn® 638, Joncryn® 646, Joncryn® 647, Joncryn® 655, and combinations thereof.
- [26] Starches include, but are not limited to amylose molecules, amylopectin, corn, wheat, potato, tapioca, rice, rye, chemical configurations of alpha-D-glucose units in the 4C1 conformation (in amylose these are linked 1-4 or 1-6), cationic starches, anion starches, nonionic starches, hydroxy-ethyl-starch, wet end starches, modified starches, surface treatment starches, cooking starches, low-gel temperature starch, Anilox 375 by Kistan Starch Company, Ethanil 50 by Kistan Starch Company, Paprilose by Kistan Starch Company, Anilox 40 by Kistan Starch Company, Ethanil 90 by Kistan Starch Company, Spraynil by Kistan Starch Company, Spraynil-Glo by Kistan Starch Company, catoril by Kistan Starch Company, aniloteric 210 by Kistan Starch Company, RX2000 by Rantec, starch derivatives, acetylated distarch adipate, acetylates distarch phosphate, acetylated starch, acid-thinned starch, agglomerated starch, allyl starch, alpha amylase, amphoteric starch, amylopectin, anhydroglucose units, anionic starch, AOX-free starch products (absorbable organic halides starches), arrowroot starch, beta amylase, bleached starch, british gum starches, carboxymethyl starch, cassava starch, cationic starch, cereal starch,

chemical gelatinization starch, chemically modified starch, chlorhydrins, chlorinated starch, chlorine-free starches, coating starch, cold water soluble starch, corrugating starch, cross-linked starch, chemical modified crosslinked starches, crystal starch, cyclodextrin, acetylated distarch adipate, acetylated distarch phosphate, acetylated starch, acid-thinned starch, agglomerated starch, allyl starch, alpha amylase, amphoteric starch, amylopectin, anhydroglucose units, anionic starch, AOX-free starch products (absorbable organic halides starches), arrowroot starch, beta amylase, bleached starch, british gum starches, carboxymethyl starch, cassava starch, cationic starch, cereal starch, chemical gelatinization starch, chemically-modified starch, chlorhydrins, chlorinated starch, chlorine-free starches, coating starch, cold water soluble starch, corrugating starch, crosslinked starch, chemical modified crosslinked starches, crystal starch, cyclodextrin, dextrin, dextrose-d-glucose, dextrose monohydrate, dialdehyde starch, distarch glycerol, distarch phosphate, drum-dried starch, dual modified starch, dusting starch, emulsifying starch, extruded starch, farina potato starch, food starch, gentobiose 1,6-b-glucosidoglucose, granular pre-swollen starch, granules-starch, granules size-starch, heat and moisture treated starch, high amylose starch, hydrophobic starch (for example without limitation ester starch n-octenyl succinate-made from treating starch with n-octenyl succinate anhydride) paper sizing starch, hydroxylpropyl starch, inhibited starch – crosslinked starch produced by treatment with a bi- or polyfunctional reagent, laundry starch, lintner starch, low viscosity starches, lump starches, maize starch, maltodextrin starch, malto-oligosaccharide, modified starch, molar substitution starches, monostarch phosphate, moulding starch, native starch, no carrier-starch-corn starch, oligosaccharides, oxidized starch (starches modified with sodium hypochlorite), pearl starch, physically modified starch, plastified starch (thermoplastic starch), potato-pulp starch, powdered starch, pregelatinized starches, resistant starch, rice starch, rye starch, saccharification hydrolyzed starch, sago starch, semi-dry modification starch, solubilized starch, sorghum starch, special starch, spray starch, starch, starch acetate, starch adipate, starch alkenyl succinate, starch derivatives, starch ester, starch ether, starch film, starch gel, starch hydrolysate, starch hydrolysis products, starch laurate, starch nitrate, starch octenyl succinate, starch paste, starch phosphate, starch slurry, starch succinate, starch xanthate, sterilizable starch, super dry starch, starch slurper (named for starch/acrylonitrile graft copolymer), surface treatment starch, sweet potato starch (bleached sweet potatoes starch), tableting starch, tapioca starch, thermo-chemical conversion starch, thermo-plastic starch,

thick-boiling starch, thin boiling starch, amylose molecules and combinations thereof.

- [27] Methylcelluloses include, but are not limited to methylcellulose, hydroxypropyl methylcellulose, ethyl cellulose, hydroxyethyl cellulose, 2-hydroxypropyl ether of methyl cellulose, propylene glycol ether of methylcellulose, 2-hydroxypropyl methyl ether, modified cellulose, hypromellose, methyl hydroxy propyl cellulose ("MHPC"), carbohydrate gum, low viscosity hydroxypropyl methylcellulose, medium viscosity hydroxypropyl methylcellulose, high viscosity hydroxypropyl methylcellulose, ultra high viscosity hydroxypropyl methylcellulose (e.g. Bencel® MP643, Isopto-Tears, Methopt, PolyTears, Tears Naturale, Methocel A, Methocel , Methocel F, Methocel J, Methocel K, Methocel 310 Series, Methocel A 15LV, Methopt, Pharmacoat®/Metrolase, Low Viscosity Methocel, Medium Viscosity Methocel, High Viscosity Methocel, low viscosity methylcellulose, medium viscosity methylcellulose, high viscosity methylcellulose, ethylcellulose, hydroxyethyl cellulose, cellulose derivatives, Ethocel, Ethoxyl Cellulose, Low Viscosity Ethylcellulose, Medium Viscosity Ethylcellulose, High Viscosity Ethylcellulose, and Ultra High Viscosity Ethylcellulose, Cellosize hydroxyethyl cellulose, Cellosize HEC, low viscosity Hydroxyethyl cellulose (WP/QP 09L, WP/QP 09H, EP 09, QP 3L), medium viscosity hydroxyethyl cellulose (QP 40, WP/QP 300, EP 300, ER 4400, QP 4400H, QP 10000H), high viscosity hydroxyethyl cellulose (QP 15000H, QP 30000H, WP/QP 52000H and QP100MH, ER 15000, ER 30000, ER 52000), Ultra High Viscosity Hydroxyethyl cellulose, POLYOX Water-Soluble Resins WRS-30, WSR 303, WSR Coagulant, WSR-301, WSR N-10, WSR N-750, WSR N-80, WSR-205, WSR N-60K, WSR-301NF, WSR N-3000, WSR N-12K, WSR N-60, WSR-205 NF, WSR N 80, WSR-1105, WSR-308, UCARFLOC 302, UCARFLOC 304, UCARFLOC 309, UCARFLOC 300 , and combinations thereof. WSR and UCARFLOC products are provided by Dow Chemical Company.

- [28] Bicarbonates include, but are not limited to sodium bicarbonates, baking soda, sodium hydrogen carbonate, ammonium hydrogen carbonate, ammonium bicarbonate, potassium bicarbonate, potassium hydrogen carbonates, and calcium bicarbonate, and combinations thereof.

- [29] Hydroxides include, but are not limited to ammonium hydroxide, calcium hydroxide, magnesium hydroxide, potassium hydroxide, and sodium hydroxide, and combinations thereof.

- [30] Combinations of Bicarbonates and Hydroxides may be used in the invention.
- [31] Polymers comprise repeated units in a chain and include, but are not limited to monomer produced polymers (including but not limited to synthetic polymers and natural polymers and combinations of synthetic and natural polymers in blended or copolymer combinations), cationic polymers, anionic polymers, nonionic polymers, polymers described as liquid crystals, water based polymers, solvent based polymers, combinations of water based and solvent based polymers, acid based polymers, alkaline based polymers, organic polymers, inorganic polymers, natural polymers, synthetic polymers, blended polymers, crosslinked polymers, nonlinear polymers, conducting polymers, non-conducting polymers, copolymers, conjugated polymers, homo-polymers, homeopolymers, heteropolymers, metapolymers, pseudopolymers, cis-polymers, trans-polymers, dipolymers, tri-polymers, tetra-polymers, copolymer blends, homo-polymer blends, polymer systems (P-Systems), polymer emulsions, polymer resins, waxes, laevo-polymers or l-polymers, dextro-polymers or D-polymers, lineomers – straight line, straight chain polymers, cyclomers – cyclic polymers, cyclo-polymers, circle polymers, aromatic polymers, polymer-astromer, annulomer, crystomers, addition polymers, condensation polymers, plastics, rubbers, epoxy resin polymers, gel polymers, thermoset polymers, thermoplastics, elastic polymer, amorphous polymers, poly-tetra-fluoroethylene (PTFE), polyacrylamides, polyisocynates, polycarbonates, poly vinyl acetates, poly vinyl chlorides, poly styrenate acrylics, poly-isoprenes, poly-isobutylenes, poly-chloroprenes, poly-dicyclopentadienes, poly (methylacrylates), poly (p-phenylene vinylenes), poly-anilines, poly-nitriles, poly-butadienes, latex, dicarboxylic acids, diamines, amines, glycols, diglycols, glycol ethers, diglycol ethers, polyhydric alcohols, alcohols, polyethylenes, polypropylenes, polyethers, polyesters, polyimides, polyamides, nylons, polyurethanes, polystyrenes, styrene acrylics, polyethylene vinyl chlorides, polyethylene vinyl acetates, polyethylene terephthalates, polyethylene terephthalatic esters, acrylics, acrylic resins, phthalates, aromatic structured polymers, and linear structured polymers.
- [32] Clays include, but are not limited to metal oxides, derivatives of clays and metal oxides, hydrated aluminum silicate, kaolin, kaolin clay, china clay, hydrafine 90, Hydrogloss 90 (Hydroglosses provide by J.M. Huber), HydroGloss 92, CoverGloss, Zirconium Oxides, Aluminum Oxides, Calcium Oxides, Iron Oxides, Magnesium Oxides, Sodium Oxides, Silica Oxides, titanium oxides, cerium oxides, dysprosium

oxides, erbium oxides, europium oxides, gadolinium oxides, holium oxides, lanthanum oxides, lutetium oxides, neodymium oxides, praseodymium oxides, samarium oxides, scandium oxides, terbium oxides, thulium oxides, yttrium oxides, gallium oxides, germanium oxides, hafnium oxides, indium oxides, niobium oxides, tantalum oxides, vanadium oxides, bismuth silicone oxides, bismuth germanium oxides, bismuth titanyl oxides, lead molybdate crystals, lithium iodate crystals and/or oxides, lithium niobate crystals and/or oxides, sodium-bismuth molybdate crystals and/or oxides, tellurium dioxide acousto-optical crystals, optical crystals, quartz crystals, calcite crystals, rutile crystals, polarization crystals, laser crystals, NLO crystals, halogenides, any metallic oxide, any metallic crystal, and combinations thereof

[33] Acrylics include, but are not limited to Acrylic Colloids, Acrylic Colloid Dispersions, Colloids, Acrylic Resins, Acrylic Resin Solutions, Acrylic Emulsions, Acrylic Film-Formers, Acrylic Non-film Formers, Acrylic Blends (including but not limited to co-polymer blends and homopolymer blends), Acrylic Vinyl Acetates, Acrylic Vinyl Ethylenes, Acrylic Vinyl Chlorides; co-polymers with vinyl acetates, vinyl ethylene acetate, vinyl ethylene chlorides, butadienes and other natural or synthetic rubbers; copolymers with neoprenes, other acrylics and other co-polymers; homopolymers; homopolymer binders; Kemicryl 3258P, Kemicryl 8820P, Kemicryl 435T, Kemicryl – ECC, Kemicryl SL, Kemicryl EC, Kemicryl GB30, Kemicryl F2, Kemicryl S804, Vancryl® 989, Vancryl® 937, RhoPlex, RhoPlex Acrylics Binders by Rohm and Haas, Styrene Acrylic Binders, Vinyl Acrylic Copolymer Binders, Vinyl Acetate Homopolymer Binders, Vinyl Acetates and/or its copolymers, Vinyl Acetate Emulsions and/or its copolymers, Vinyl Ethylene-Chloride Emulsions and/or its copolymers, Vinyl Ethylene Chlorides and/or its copolymers, Ethylene Vinyl-chlorides, and Ethylene vinyl-chloride emulsions, and combinations thereof.

[34] Premixes may be prepared and then the polymer compositions may be prepared by adding the components to the premix. These premixes may include but are not limited to encapsulated clays and/or encapsulated pastes. Preferred components of the premix include but are not limited to clays, pastes, Joncryl® 660, Vancryl® 989, Joncryl® 2641, Joncryl® 120, Joncryl® 74, Joncryl® 1674, and combinations thereof.

[35] Water includes, but is not limited to, distilled water and tap water. The preferred tap water is tap water in Philadelphia, PA.

[36] Example 1

[37] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryl® 660	250
Vancryl® 989	160
Vancryl® 937	70
Phase 2	
Vancryl® 605	35
Vancryl® 989	35
Phase 3	
Vancryl® 605	35
Vancryl® 989	35
Phase 4	
Vancryl® 605	35
Vancryl® 989	35
Phase 5	
Vancryl® 937	35
Vancryl® 610	35
Phase 6	
Vancryl® 937	35
Vancryl® 610	35
Phase 7	
Vancryl® 937	35
Vancryl® 610	35
Phase 8	
Joncryl® 74	55
Vancryl® 965	54
Joncryl® 74	55
Phase 9	
Vancryl® 989	35
Vancryl® 605	35
Phase 10	
Vancryl® 989	35
Vancryl® 605	35

Phase 11	
Vancryl® 989	35
Vancryl® 605	35
Phase 12	
Vancryl® 610	35
Vancryl® 937	35
Phase 13	
Vancryl® 610	35
Vancryl® 937	35
Phase 14	
Vancryl® 610	35
Vancryl® 937	35
Phase 15	
Vancryl® 989	35
Vancryl® 937	35
Joncryl® 660 and Water combined first	92 32
Vancryl® 937	35
Joncryl® 537	60
Joncryl® 120 and Joncryl® 1674 combined first	80 80

[38] Example 2

[39] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryl® 660	250
Vancryl® 989	160
Vancryl® 937	70
Phase 2	
Joncryl® 77	38
Vancryl® 610	35
Phase 3	

Joncryn® 77	38
Vancryn® 610	35
Phase 4	
Joncryn® 77	38
Vancryn® 610	35
Phase 5	
Vancryn® 937	35
Vancryn® 610	35
Phase 6	
Vancryn® 937	35
Vancryn® 610	35
Phase 7	
Vancryn® 937	35
Vancryn® 610	35
Phase 8	
Joncryn® 74	55
Vancryn® 965	54
Joncryn® 74	55
Phase 9	
Vancryn® 610	35
Joncryn® 77	38
Phase 10	
Vancryn® 610	35
Joncryn® 77	38
Phase 11	
Vancryn® 610	35
Joncryn® 77	38
Phase 12	
Vancryn® 610	35
Vancryn® 937	35
Phase 13	
Vancryn® 610	35
Vancryn® 937	35
Phase 14	
Vancryn® 610	35
Vancryn® 937	35
Phase 15	
Vancryn® 989	35
Vancryn® 937	35
Joncryn® 660	92
WATER	32
Vancryn® 937	35
Joncryn® 537	60

Joncryn® 120	80
Joncryn® 1674	80

[40] It is also possible to prepare this Example 2 after preparing one of the following premixes and then adding Example 2 to one of the premixes. The premixes are prepared preferably at about room temperature and about atmospheric pressure under constant mixing.

[41] The premixes may be made with any one of three pastes ("Pastes") below. The Pastes are prepared preferably at about room temperature and about atmospheric pressure under constant mixing. It is preferable to add the components in order.

Paste 1

Component	Weight percent of total Paste
Hydrogloss 90	16.66
Baking Soda	16.66
Catosize 270A (provided by National Starch)	16.66
water	33.33
Vancryn 450	16.66

Paste 2

Component	Weight percent of total Paste
Hydrogloss 90	17.7
Baking Soda	17.7
Catosize 270A (provided by National Starch)	17.7
water	20
Joncryn HPD 96	26.66

Paste 3

Component	Weight percent of total Paste
Hydrogloss 90	12.5
Baking Soda	12.5
Catosize 270A (provided by National Starch)	12.5
water	25
Vancryn 450	12.5
Joncryn HPD 96	25

Pre-Mix 1

Component	Weight (in grams)
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Joncryl® 660	500
Vancryl® 989	500
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 2

Component	Weight (in grams)
Vancryl® 937	500
Water	500
Acrylic Colloids	400
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 3

Component	Weight (in grams)
Joncryl® 77	500
Vancryl® 989	500
Clays or Pastes	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 4

Component	Weight (in grams)
Vancryl® 937	500
Vancryl® 989	500
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 5

Component	Weight (in grams)
Joncryl® 660	500
Paste	500
Vancryl® 989	500
Paste	500
Joncryl® 77	500

[42] Example 3

[43] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryn® 660	250
Vancryn® 989	160
Vancryn® 937	70
Phase 2	
Joncryn® HPD 96	55
Joncryn® 77	38
Vancryn® 989	38
Vancryn® 605	38
Phase 3	
Joncryn® HPD 96	55
Joncryn® 77	38
Vancryn® 989	38
Vancryn® 605	38
Phase 4	
Joncryn® HPD 96	55
Joncryn® 77	38
Vancryn® 989	38
Vancryn® 605	38
Phase 5	
Joncryn® HPD 96	55
Joncryn® 77	38
Vancryn® 989	38
Vancryn® 605	38
Phase 6	
Joncryn® HPD 96	55
Joncryn® 77	38
Vancryn® 989	38
Vancryn® 605	38
Phase 7	
Joncryn® HPD 96	55
Joncryn® 77	38

Vancryl® 989	38
Vancryl® 605	38
Phase 8	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 605	38
Phase 9	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 605	38
Phase 10	
Joncryl® HPD 96	50
Vancryl® 937	50
Vancryl® 989	50
Joncryl® 2641	50
Vancryl® 965	50
Joncryl® 2641	50
Vancryl® 989	50
Vancryl® 937	50
Joncryl® 77	50
WATER	200
Phase 11	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 605	38
Phase 12	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 605	38
Phase 13	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 605	38
Phase 14	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 605	38

Phase 15	
Joncryn® HPD 96	55
Vancryn® 937	38
Vancryn® 989	38
Vancryn® 605	38
Phase 16	
Joncryn® HPD 96	55
Vancryn® 937	38
Vancryn® 989	38
Vancryn® 605	38
Phase 17	
Joncryn® HPD 96	55
Vancryn® 937	38
Vancryn® 989	38
Vancryn® 605	38
Phase 18	
Joncryn® HPD 96	55
Vancryn® 937	38
Vancryn® 989	38
Vancryn® 605	38
Phase 19	
Joncryn® HPD 96	76
Vancryn® 937	76
Vancryn® 989	100
Phase 20	
Joncryn® 2641	130
Joncryn® 120	65
Joncryn® 1674	65
Phase 21	
Joncryn® 2641	130
Joncryn® 120	65
Joncryn® 1674	65
Phase 22	
Joncryn® 2641	130
Joncryn® 120	65
Joncryn® 1674	65

[44] Example 4

[45] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added

in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryn® 660	250
Vancryn® 989	160
Vancryn® 937	70
Phase 2	
Vancryn® 605	35
Vancryn® 610	35
Phase 3	
Vancryn® 605	35
Vancryn® 610	35
Phase 4	
Vancryn® 605	35
Vancryn® 610	35
Phase 5	
Vancryn® 605	35
Vancryn® 610	35
Phase 6	
Vancryn® 605	35
Vancryn® 610	35
Phase 7	
Vancryn® 605	35
Vancryn® 610	35
Phase 8	
Joncryn® 74	55
Vancryn® 965	54
Joncryn® 74	55
Phase 9	
Vancryn® 610	35
Vancryn® 605	35
Phase 10	
Vancryn® 610	35
Vancryn® 605	35
Phase 11	
Vancryn® 610	35
Vancryn® 605	35
Phase 12	

Vancryl® 610	35
Vancryl® 605	35
Phase 13	
Vancryl® 610	35
Vancryl® 605	35
Phase 14	
Vancryl® 610	35
Vancryl® 605	35
Phase 15	
Vancryl® 989	35
Vancryl® 937	35
Joncryl® 660	92
WATER	32
Vancryl® 937	35
Joncryl® 537	60
Joncryl® 120	80
Joncryl® 1674	80

[46] Example 5

[47] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryl® 660	250
Vancryl® 989	160
Vancryl® 937	70
Phase 2	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35
Vancryl® 825	35
Phase 3	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35

Vancryl® 825	35
Phase 4	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35
Vancryl® 825	35
Phase 5	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35
Vancryl® 825	35
Phase 6	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35
Vancryl® 825	35
Phase 7	
Vancryl® 989	35
Joncryl® 77	35
Vancryl® 989	35
Vancryl® 825	35
Phase 8	
Vancryl® 937	50
Joncryl® 74	55
Vancryl® 965	54
Joncryl® 74	55
Vancryl® 937	50
Phase 9	
Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 10	
Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 11	
Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 12	

Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 13	
Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 14	
Vancryl® 989	35
Vancryl® 937	35
Vancryl® 989	35
Vancryl® 825	35
Phase 15	
Vancryl® 937	35
Combine first	
Joncryl® 660	92
Water	32
Vancryl® 937	35
Joncryl® 2178	116
Joncryl® 120	58
Joncryl® 1674	58
Joncryl® 2178	116
Joncryl® 120	58
Joncryl® 1674	58

[48] It is also possible to prepare this Example 5 after preparing one of the following premixes and then adding Example 5 to one of the premixes. The premixes are prepared preferably at about room temperature and about atmospheric pressure under constant mixing.

[49] The premixes may be made with any one of three pastes (“Pastes”) below. The Pastes are prepared preferably at about room temperature and about atmospheric pressure under constant mixing. It is preferable to add the components in order.

Paste 1

Component	Weight percent of total Paste
Hydrogloss 90	16.66
Baking Soda	16.66
Catosize 270A (provided by National Starch)	16.66

water	33.33
Vancryl 450	16.66

Paste 2

Component	Weight percent of total Paste
Hydrogloss 90	17.7
Baking Soda	17.7
Catosize 270A (provided by National Starch)	17.7
water	20
Joncryl HPD 96	26.66

Paste 3

Component	Weight percent of total Paste
Hydrogloss 90	12.5
Baking Soda	12.5
Catosize 270A (provided by National Starch)	12.5
water	25
Vancryl 450	12.5
Joncryl HPD 96	25

Pre-Mix 1

Component	Weight (in grams)
Joncryl® 660	500
Vancryl® 989	500
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 2

Component	Weight (in grams)
Vancryl® 937	500
Water	500
Acrylic Colloids	400
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 3

Component	Weight (in grams)
Joncryl® 77	500

Vancryl® 989	500
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 4

Component	Weight (in grams)
Vancryl® 937	500
Vancryl® 989	500
Paste	1000
Joncryl® 77	500
Vancryl® 989	500
Paste	1000

Pre-Mix 5

Component	Weight (in grams)
Joncryl® 660	500
Paste	500
Vancryl® 989	500
Paste	500
Joncryl® 77	500

[50] Example 6

[51] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Joncryl® 660	250
Vancryl® 989	160
Vancryl® 937	70
Phase 2	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38

Vancryl® 825	35
Phase 3	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 4	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 5	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 6	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 7	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 8	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 9	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 10	
Joncryl® HPD 96	55
Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 11	
Joncryl® HPD 96	55

Joncryl® 77	38
Vancryl® 989	38
Vancryl® 825	35
Phase 12	
Joncryl® HPD 96	50
Vancryl® 937	50
Vancryl® 989	50
Joncryl® 2641	50
Vancryl® 965	50
Joncryl® 2641	50
Vancryl® 989	50
Vancryl® 937	50
Joncryl® 77	50
WATER	200
Phase 13	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 14	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 15	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 16	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 17	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 18	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38

Vancryl® 825	35
Phase 19	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 20	
Joncryl® HPD 96	55
Vancryl® 937	38
Vancryl® 989	38
Vancryl® 825	35
Phase 21	
Joncryl® HPD 96	76
Vancryl® 937	76
Vancryl® 989	100
Phase 22	
Joncryl® 2641	130
Joncryl® 120	65
Joncryl® 1674	65
Phase 23	
Joncryl® 2641	130
Joncryl® 120	65
Joncryl® 1674	65
Phase 24	
Joncryl® 2641	130
Joncryl® 120	65
Joncryl® 1674	65

[52] Example 7

[53] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

[54] The Premix D employed in Example 7 is prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components are preferably added in order. The resin may comprise an encapsulated form of the paste.

PreMix D

Component	Weight (in grams)
Vancryl® 937	25
Vancryl® 989	25
Joncryl® 2641	50
Paste 2	50
Joncryl® 2641	50
Joncryl® 120	25
Joncryl® 1674	25
Paste 2	50
Joncryl® 2641	50
Joncryl® 120	25
Joncryl® 1674	25
Paste 2	50
Joncryl® 2641	50
Joncryl® 120	25
Joncryl® 1674	25
Paste 2	50
Joncryl® 2641	50
Joncryl® 120	25
Joncryl® 1674	25
Paste 2	50
Joncryl® 2641	50
Joncryl® 120	25
Joncryl® 1674	25

Composition of Example 7

Component	Weight (in grams)
Phase 1	
PreMix D	1660
Joncryl® 77	75
Phase 2	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 3	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 4	
Vancryl® 685	30
Joncryl® 77	20

Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 5	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 6	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 7	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 8	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 9	
Vancryl® 685	30
Joncryl® 77	20
Vancryl® 989	18
Vancryl® 937	18
Joncryl® 2641	25
Phase 10	
Vancryl® 685	50
Vancryl® 937	50
Vancryl® 989	50
Joncryl® 2641	150
Joncryl® 2641	120
Vancryl® 965	94
Joncryl® 2641	120
Joncryl® 2641	150

Vancryl® 989	50
Vancryl® 937	50
Joncryl® 77	50
WATER	200
Phase 11	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 12	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 13	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 14	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 15	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 16	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 17	
Vancryl® 685	30
Joncryl® 77	22

Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 18	
Vancryl® 685	30
Joncryl® 77	22
Vancryl® 989	20
Vancryl® 937	20
Joncryl® 2641	26
Phase 19	
Joncryl® 2641	50
Vancryl® 685	50
Vancryl® 937	50
Vancryl® 989	50
Phase 20	
Joncryl® 2641	200
Joncryl® 120	100
Joncryl® 1674	100
Phase 21	
Joncryl® 2641	200
Joncryl® 120	100
Joncryl® 1674	100
Phase 22	
Joncryl® 2641	200
Joncryl® 120	100
Joncryl® 1674	100

[55] Example 8

[56] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Vancryl® 965	975.22
DH2O	195.09
Vancryl® 450	195.09

DH2O	195.09
E200 (which is polyethylene glycol)	195.09
Phase 2	
Vancryl® 965	975.22
DH2O	195.09
Vancryl® 450	195.09
DH2O	195.09
E200	195.09
Phase 3	
Vancryl® 965	975.22
DH2O	195.09
Vancryl® 450	195.09
DH2O	195.09
E200	195.09
Phase 4	
Vancryl® 937	390.18
Joncryl® 1645	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 5	
Vancryl® 937	390.18
Joncryl® 1645	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 6	
Vancryl® 937	390.18
Joncryl® 1645	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 7	
Vancryl® 937	390.18
Joncryl® 1645	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 8	
Joncryl® 28	390.18
Joncryl® 1620	390.18
Vancryl® 937	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 9	
Joncryl® 28	390.18
Joncryl® 1620	390.18

Vancryl® 937	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 10	
Joncryl® 28	390.18
Joncryl® 1620	390.18
Vancryl® 937	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 11	
Joncryl® 28	390.18
Joncryl® 1620	390.18
Vancryl® 937	390.18
Vancryl® 989	390.18
Vancryl® 937	390.18
Phase 12	
Vancryl® 965	50
Combine first distilled water	10
Vancryl® 450	10
Combine first distilled water	10
E200	10
Phase 13	
Vancryl® 965	50
Combine first distilled water	10
Vancryl® 450	10
Combine first distilled water	10
E200	10
Phase 14	
Vancryl® 965	50
Combine first distilled water	10
Vancryl® 450	10
Combine first distilled water	10
E200	10
Phase 15	
Vancryl® 937	20
Joncryl® 1645	20
Vancryl® 989	20
Vancryl® 937	20

Phase 16	
Vancryl® 937	20
Joncryl® 1645	20
Vancryl® 989	20
Vancryl® 937	20
Phase 17	
Vancryl® 937	20
Joncryl® 1645	20
Vancryl® 989	20
Vancryl® 937	20
Phase 18	
Vancryl® 937	20
Joncryl® 1645	20
Vancryl® 989	20
Vancryl® 937	20
Phase 19	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 937	20
Vancryl® 989	20
Vancryl® 937	20
Phase 20	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 937	20
Vancryl® 989	20
Vancryl® 937	20
Phase 21	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 937	20
Vancryl® 989	20
Vancryl® 937	20
Phase 22	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 937	20
Vancryl® 989	20
Vancryl® 937	20

[57] Example 9

[58] One polymer composition was prepared as follows at about room temperature and about atmospheric pressure and under constant mixing. The components were added in the sequence specified and it is believed without limitation that each phase designated in the table may form a separate stable subcomposition within the composition.

Component	Weight (in grams)
Phase 1	
Vancryl® 965	50
DH2O	10
Vancryl® 450	10
Combine first	
DH2O	10
E200	10
Phase 2	
Vancryl® 965	50
DH2O	10
Vancryl® 450	10
Combine first	
DH2O	10
E200	10
Phase 3	
Vancryl® 965	50
DH2O	10
Vancryl® 450	10
Combine first	
DH2O	10
E200	10
Phase 4	
Vancryl® 937	20
Joncryl® 1645	20
Joncryl® 537	20
Vancryl® 937	20
Phase 5	
Vancryl® 937	20
Joncryl® 1645	20
Joncryl® 537	20
Vancryl® 937	20
Phase 6	
Vancryl® 937	20
Joncryl® 1645	20
Joncryl® 537	20

Vancryl® 937	20
Phase 7	
Vancryl® 937	20
Joncryl® 1645	20
Joncryl® 537	20
Vancryl® 937	20
Phase 8	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 989	20
Vancryl® 937	20
Phase 9	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 989	20
Vancryl® 937	20
Phase 10	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 989	20
Vancryl® 937	20
Phase 11	
Joncryl® 28	20
Joncryl® 1670	20
Vancryl® 989	20
Vancryl® 937	20

[59] Example 10

[60] The following are premixes which may be prepared according to the invention. The pastes may be without limitation Paste 1, Paste 2 or Paste 3.

[61] PreMix A: The following components are added to the composition in order and preferably at about room temperature and about atmospheric pressure and constant mixing: Joncryl® 660, Vancryl® 989, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 74, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 74, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 74, paste, Joncryl® 2641, Joncryl® 120, and Joncryl® 74.

- [62] PreMix B: The following components are added to the composition in order and preferably at about room temperature and about atmospheric pressure and constant mixing: Joncryl® 660, Vancryl® 989, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 1674, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 1674, paste, Joncryl® 2641, Joncryl® 120, Joncryl® 1674, paste, Joncryl® 2641, Joncryl® 120, and Joncryl® 1674.
- [63] PreMix C: The following components are added to the composition in order and preferably at about room temperature and about atmospheric pressure and constant mixing: Joncryl® 660, water, paste, Vancryl® 825, paste, Vancryl® 825, paste, Vancryl® 825, paste, and Vancryl® 825. In this premix, the paste may be made with or without acrylic resins or acrylic colloid pastes.
- [64] Example 11
- [65] The following is a polymer composition which may stand alone or may be added as the last phase in forming other polymer compositions. The components are preferably added in order and under about room temperature and about atmospheric pressure and constant mixing. This polymer composition is preferably used as a top coating for vinyl.
- [66] Phase 1: Vancryl® 965, water, Vancryl® 450, Water and E200.
- [67] Phase 2: Vancryl® 965, water, Vancryl® 450, water, and E200.
- [68] Phase 3: Vancryl® 965, water, Vancryl® 450, water, and E200.
- [69] Phase 4: Vancryl® 937, Joncryl® 1645, Vancryl® 989 and Vancryl® 937.
- [70] Phase 5: Vancryl® 937, Joncryl® 1645, Vancryl® 989 and Vancryl® 937.
- [71] Phase 6: Vancryl® 937, Joncryl® 1645, Vancryl® 989 and Vancryl® 937.
- [72] Phase 7: Vancryl® 937, Joncryl® 1645, Vancryl® 989 and Vancryl® 937.
- [73] Phase 8: Jonwax® 28, Joncryl® 1620, Vancryl® 937, Vancryl® 989 and Vancryl® 937.
- [74] Phase 9: Jonwax® 28, Joncryl® 1620, Vancryl® 937, Vancryl® 989 and Vancryl® 937.

- [75] Phase 10: Jonwax® 28, Joncryl® 1620, Vancryl® 937, Vancryl® 989 and Vancryl® 937.
- [76] Phase 11: Jonwax® 28, Joncryl® 1620, Vancryl® 937, Vancryl® 989 and Vancryl® 937.
- [77] It is understood that while the invention has been described in conjunction with the detailed description thereof, that the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are evident from a review of the following claims.